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GENERAL NOTES.

BOTANY.

CLEISTOGAMOUS FLOWERS IN *DANTHONIA* —At the end of August last, Mr. Edwin Faxon and I, in the White Mountain Notch, collected a form of *Danthonia* which interested us much ; although resembling *D. spicata* in its panicle, its culm was stouter than we had ever seen in this species, greatly swollen above the nodes, readily disarticulating as we sought to secure a supply (the plants being mostly out of season at that time), and showed in some specimens a panicle below the terminal one bursting from the upper sheath ; the root-leaves as well as those of the culm were unusually large and long for *D. spicata*.

Mr. Chas. E. Faxon submitted his brother's specimens to Mr. C. F. Austin, who, though he thought the plant might be a form of *D. spicata*, described it under the provisional name of *D. Faxonii*, observing especially the unusually long and pointed teeth of the lower palet, and assuming that the culm of *D. spicata* is always single.

Not long since, on one of the mountains of Western Vermont, I came across specimens of *D. spicata*, which at once suggested to me the plants I had seen in the White Mountains, and tearing away their sheaths, I found concealed flowers in every specimen. Following up this clue to a solution of the puzzle presented by the White Mountain plant, I have since examined a large number of specimens of *Danthonia spicata*, and in every instance have detected flowers concealed in the sheaths, even the most depauperate plants with slender culms less than a foot in height showing at least rudiments of flowers.

Within the sheath on the side opposite its slit the culm is concave from the node upward, and the chamber thus formed is occupied by a spikelet one to ten-flowered, sessile on the node, and subtended by two awl-shaped, unequal, sometimes subequal, plumes, two to six lines long, and very rough on their back ; or, in the case of the stouter plants, and in their upper sheaths, by two or more such spikelets, standing still sessile, side by side ; or again, as in the case of the White Mountain specimens, by small panicles approaching in character the terminal one. In the smallest plants these spikelets are often undeveloped beyond a pair of short glumes ; in all they are simplest toward the base of the culm ; in the lower sheath of ordinary plants they are one-flowered ; when several-flowered they are filiform, rather moniliform, the flowers being so distant on their rachis as barely to touch each other.

In the simplest state of the flowers, that is in the one-flowered, or few-flowered, spikelets near the base of medium-sized culms, their lower palet is smooth and shining, quite coriaceous, and, though tapering into an acuminate point, is entirely awnless. As

the spikelets become more highly developed, or are multiplied, toward the summit of the culm, particularly in the stouter specimens, the flowers generally approach in character those of the terminal panicle, their outer palets becoming by degrees thinner and rougher, and assuming an awn, at first short, straight, and terminal, then becoming more and more twisted, and placed lower and lower between the teeth of the notched apex. The glumes, also, are gradually modified, until as shown by the specimens from the White Mountain Notch, those of the upper spikelets in the panicle issuing from the sheath of the upper leaf are scarcely different from those of the terminal panicle. These hidden flowers are perfect, the palets of moss of those examined being found to enclose well-developed seeds. May they not be considered as a special means for the dissemination of this plant, which as a matter of fact is rapidly spreading over the drier soils of Vermont to the great detriment of agriculture, an ultimate scourge, completing the desolation begun by indiscriminate use of the axe, and helped on by the consequent increasing droughts of our summers? The seeds borne at the top of the culm of this grass fall readily for the most part in mid-summer; without aid in their dispersion, they must lodge in their immediate vicinity. But these concealed seeds securely stored within the sheath of the culms, when these are disjointed and swept away before the winds of autumn and winter, go to plant the species in new fields.

Danthonia compressa Austin, exhibits precisely the same cleistogamous flowers as *D. spicata*, and its culm disarticulates even more readily. In one of the few specimens of *D. sericea*, examined with this view, I find a one-flowered spikelet in its lower sheath; in this species, however, as it may be worth mentioning, the culms seem less stiff and not so easily separable at the joints.

In other genera of this family are these flowers to be found. I have already observed them in *Vilfa*, *Holcus*, and *Arrhenatherum*.—C. G. Pringle.

FERNS OF NORTH AMERICA¹.—In the present number plates are given of *Asplenium ebeneum* Aiton., *Asplenium ebenoides* Scott. Three species of *Botrychium*, namely, *B. lunaria* Sw., *B. lanceolatum* Ang., and *B. coreale* Milde, *Cheilanthes lanuginosa* Nutt., and *Cheilanthes californica* Mett. All of these except the last are described at considerable length. Prof. Eaton begins in each case with a concise diagnosis. This is followed by the synonymy and a list of localities, after which there is given in clear language a detailed description of typical specimens and of the troublesome varieties. The drawings by Mr. Emerton and the lithographic printing are well done. We must again express not only our pleasure at the excellence of the work, but our surprise at the remarkably low price at which it is furnished.—G. L. G.

¹ By Prof. DANIEL C. EATON. Part 2—Naturalists' Agency, Salem, Mass., \$1.00.

A FOSSIL FUNGUS.—One of the most interesting recent discoveries in palæo-phytology has just been made by the English cryptogamist, Mr. Worthington Smith, in the detection, in the coal-measures, of a fossil fungus nearly allied to that which produces the potato-blight, and which he has named *Peronosporites antiquarius*. Fossil Fungi were not previously altogether unknown. Some years ago Mr. Carruthers, the keeper of the botanical department in the British Museum, detected mycelial threads among the cells of a fossil fern (*Osmunda*) from the Lower eocene strata of Herne bay ; and Mr. Darwin has stated that fungus threads in a fossil state in silicified wood were shown to him more than forty years ago, by Mr. Robert Brown. Messrs. Hancock and Asthey have also described in the *Annals and Magazine of Natural History* (4th ser. vol. iv, 1869, p. 221, t. ix, x), under the name of *Archigaricon*, what may be a fossil *Peronosporites* from the Crawlington black shale. The specimen examined by Mr. Worthington Smith (the fungoid nature of the organism having been first suggested by M. Carruthers) was seen within the vascular axis of a *Lepidodendron*, and is thus described by that gentleman:—It consists of a mass of mycelia and zoosporangia (or oogonia). Beginning with mycelium, a close examination shows that it is furnished with numerous joints or septa. If, therefore, any reliance is to be placed upon the modern distinguishing characters of the now living species of the genera *Peronospora* and *Pythium*, as furnished by a septate or non-septate mycelium, the fossil parasite belongs to the former, and not to the latter genus, nor to any of the Saprolegineæ. The oogonia do not agree with those of *Cystopus*. Within many of the fossil oogonia the differentiation of the protoplasm into zoospores is clearly seen ; but if any doubt could exist as to the exact nature of this differentiation, then other oogonia (or zoosporangia) on the same slide show the contained zoospores with a clearness not to be exceeded by any living specimens of the present time. It is a very remarkable fact that the oogonium precisely resembles, in size and other characters, average oogonia of the present day, especially those belonging to *Peronospora infestans*. The contained zoospores are, moreover, the same in form and dimensions with those of *P. infestans* when measured to the ten-thousandth of an inch. The organisms are in fact apparently identical ; and the average number of zoospores in each oogonium is also the same, viz. : seven or eight. The aerial condition of the fungus has not been observed. Mr. Worthington Smith suggests, in conclusion, that we probably have in *Peronosporites antiquarius* one of the primordial plants from which both the great families of Fungi and Algæ may possibly have descended. There is no doubt that the Peronosporæ and Saprolegineæ are very closely allied ; and yet the former are commonly placed among Fungi, the latter among Algæ ; and we may possibly here have the point of departure from which the two families branched out.—A. W. Bennett.

BOTANICAL NEWS.—The Transactions of the Academy of Science of St. Louis, Vol. iii, No. 4, 1878, contain the following botanical papers of interest, by Dr. George Engelmann: On the Oaks of the United States; The Flowering of *Agave shawii* (with a plate); The American Junipers of the section *Sabina* (with cuts); A Synopsis of American Firs (*Abies* Link); Oak and Grape Fungi.

Dr. Aug. Jæger continues his *Genera et Species Muscorum*, with reference to the mosses of the globe, in the Proceedings of the Natural History Society of St. Gall. The Proceedings of the Royal Danish Academy of Science contain an elaborate paper by Eugene Warming, on the development and morphology of the Cycads (with three plates). His studies were principally based on *Ceratozamia longifolia* and *brevifrons*, and also different species of *Zamia*, *Cycas* and *Dioon*. An important paper by Prof. E. Strasburger, on fructification and cell-division, appears in the Jena Zeitschrift, Bd. 11, Heft 4.

In the extraordinary volume of the Nova Acta of the Royal Society of Upsal, Prof. Fries describes the species of Swedish *Polybalsticæ*. The *Botanologia* of R. F. Fristedt is for the first time published. F. R. Kjellman discusses the algæ of the West Coast of Nowaja Semlja and Wajgatsch. Axel N. Lundström's critical remarks on the willows of Nowaja Semlja, and their genetic relations, is illustrated by an interesting plate, while Wittrock's elaborate paper on the development and systematic arrangement of the Pithophoraceæ, a new order of Algæ, will be of much interest to algologists.

Dr. Oscar Drude contributes a valuable paper to Petermann's *Mittheilungen* for January, on the geographical distribution of palms. The *Journal of Botany* for January contains a paper by A. Dickson on the structure of the pitcher of *Cephalotus follicularis*; the February number, Side-lights on the structure of Composites, and a note on the Dimorphism of Restiaceæ, by M. T. Masters.

The Bulletin of the Torrey Botanical Club for January, contains a valuable paper by G. E. Davenport, on Vernation in Botrychia, with a plate. In the Botanical Gazette for February, A. W. Chapman continues his enumeration of new Floridian plants.

ZOÖLOGY.¹

NOTES ON THE NESTING HABITS OF THE ENGLISH SPARROW.—Statements frequently come under my observation regarding the habit of this bird of appropriating the nests of other species for its own use. A prominent example of this kind came to view during the spring of 1875, at Reading, Penna. In 1874 I occupied a sleeping apartment, about eight or ten feet from the windows of which a pair of robins had constructed a nest in the

¹ The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A.